

Vernier-Scaled High-Resolution Encoder**ABSTRACT**

An encoder having a first array of n photodetectors and a code strip imaging system where $n > 2$ is disclosed. Each photodetector is characterized by a width d . The code strip imaging system generates an image of a code strip on the first array. The image includes alternating dark and light stripes of width D . The dark stripes have a lower luminosity than the white stripes. The widths of the photodetectors and stripes in the image are chosen such that $nd = (n-1)D$, the code strip image moving in a first direction with respect to the first array, wherein the distances d and D are measured in a direction parallel to the first direction. Detector circuits convert the outputs from the photodetectors to logic signals that define a state for the encoder that repetitively cycles through $2n$ values when the code strip image moves a distance of $2D$.